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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/964,939	09/27/2001	Frederick M. Discenzo	01RE098	2206

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EXAMINER	
ORTIZ RODRIGUEZ, CARLOS R	

ART UNIT	PAPER NUMBER
2125	

DATE MAILED: 08/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/964,939	DISCENZO ET AL.	
	Examiner	Art Unit	
	Carlos Ortiz-Rodriguez	2125	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed 05/24/05, have been fully considered but are moot in view of the new ground of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 23, 26, 34-35 and 37-42 rejected under 35 U.S.C. 103(a) as being unpatentable over Hays et al. U.S Patent No. 6,260,004 in combination with Webster, "Wiley Encyclopedia of Electrical and Electronics Engineering", Vol. 13, 1999.

Regarding claim 1, 23, 26, and 34-35 Hays et al. discloses a control system for controlling a process having a pump with an associated motor, the control system comprising: a motor drive providing electrical power to the motor in a controlled fashion according to a control signal (C6 L54-57, C11 L49-51, C14 L55-67 and C19 34-39); and a controller providing the control signal according to a desired operating point within an allowable range of operation about a process setpoint (C14 L55-67); wherein the controller selects the desired operating point

according to performance characteristics associated with a plurality of components in the process (C19 L20-33 and C28 L50-54).

But, Hays et al. fails to clearly specify a controller providing the control signal to the motor drive.

However, Hays et al. in combination with "Wiley Encyclopedia of Electrical and Electronics Engineering", disclose the controller providing the control signal to the motor drive (see "Wiley Encyclopedia of Electrical and Electronics Engineering", Page 549 Column 2 Paragraph 1 and 2 and Fig 4).

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Hays et al. and combining it with the teachings disclosed by "Wiley Encyclopedia of Electrical and Electronics Engineering". The results of this combination would lead to system and method for dynamic multi-objective optimization of pumping system operation and diagnostics.

One of ordinary skill in the art would have been motivated to do this modification because it is known in this art to provide control signal to motor drives.

Regarding claims 37 and 40 Hays et al. discloses a pump control system for automatically operating a pump driven by a motor in a controlled fashion, comprising: a motor drive providing electric power to operate the motor in a controlled fashion according to a motor control signal (C6 L54-57, C11 L49-51, C14 L55-67 and C19 34-39); and a controller comprising a diagnostic component operatively connected to diagnose an operating condition associated with the pump; wherein the controller provides the control signal according to a setpoint and a diagnostic signal

from the diagnostic component according to the diagnosed operating condition in the pump (C10 L33-43, C14 L55-67, and C16 L50-67).

But, Hays et al. fails to clearly specify a controller providing the control signal to the motor drive.

However, Hays et al. in combination with "Wiley Encyclopedia of Electrical and Electronics Engineering", disclose the controller providing the control signal to the motor drive (see "Wiley Encyclopedia of Electrical and Electronics Engineering", Page 549 Column 2 Paragraph 1 and 2 and Fig 4).

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Hays et al. and combining it with the teachings disclosed by "Wiley Encyclopedia of Electrical and Electronics Engineering". The results of this combination would lead to system and method for dynamic multi-objective optimization of pumping system operation and diagnostics.

One of ordinary skill in the art would have been motivated to do this modification because it is known in this art to provide control signal to motor drives.

Regarding claims 38 and 41 Hays et al. in combination with "Wiley Encyclopedia of Electrical and Electronics Engineering", further disclose the pump control system wherein the diagnostic component performs signature analysis of at least one sensor signal from a sensor associated with the pump in order to diagnose the operating condition associated with the pump (see Hays et al. abstract L6-11).

Regarding claims 39 and 42 Hays et al. in combination with "Wiley Encyclopedia of Electrical and Electronics Engineering", further disclose the control system wherein the at least one sensor signal is related to one of flow, pressure, current, noise, vibration, and temperature associated with the pump (see Hays et al. C12 L66).

4. Claims 2, 3, 4, 6, 10, 11, 13, 17-22, 24, 25, 27, 30, 31, 32, 33 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hays et al. U.S Patent No. 6,260,004 in view of Webster, "Wiley Encyclopedia of Electrical and Electronics Engineering", Vol. 13, 1999 and further in view Irvin U.S. Patent No. 5,742,500.

Regarding claim 2 and 24 Hays et al. in combination with "Wiley Encyclopedia of Electrical and Electronics Engineering" disclose all the limitations of base claims.

But Hays et al. in combination with "Wiley Encyclopedia of Electrical and Electronics Engineering" fails to clearly specify wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein the performance characteristics associated with a plurality of components in the system comprises efficiencies of at least two of the motor, the pump, and the motor drive.

However Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin disclose the method, wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein the performance characteristics associated with a

plurality of components in the system comprises efficiencies of at least two of the motor, the pump, and the motor drive (see Irvin col 1 lines 24-33).

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Hays et al. in combination with "Wiley Encyclopedia of Electrical and Electronics Engineering" and further combining it with the invention disclosed by Irvin. The results of this combination would lead to system and method for dynamic multi-objective optimization of pumping system operation and diagnostics.

One of ordinary skill in the art would have been motivated to do this modification because it is known in this art to control system with more than one motor.

Regarding claims 3 and 6, 13 and 27 Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin further disclose obtaining the system setpoint and the allowable range of operation from a user (see Irvin col 4 lines 23-31).

Regarding claims 4, 11 and 25 Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin further disclose the method, wherein selecting the desired operating point comprises: correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated system efficiency information; and selecting the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated system efficiency information (see Irvin col 10 lines 31-34).

Regarding claims 10, 17 and 30 Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin further disclose obtaining at least a portion of one of the efficiency information, the allowable range, and the system setpoint from prior operation of the system (see Irvin col 2 lines 15-17).

Regarding claim 18-21 and 33 Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin further disclose a motorized pump system for pumping fluid, having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor (see Irvin col 1 line 49 and col 1 lines 23-25 and fig 1), wherein the component performance information comprises efficiency information related to at least two of the motor, the pump, and the motor drive(see Irvin col 2 lines 44-47), and wherein the correlated system performance information comprises cost information related to the system operational cost per unit of fluid pumped (see Irvin col 13 lines 2-3).

Regarding claim 22 Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin further disclose selecting the desired operating point comprises measuring at least one process variable from a sensor associated with the system (see Irvin col 12 line 4).

Regarding claim 31, Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin further disclose the control system wherein the controller is adapted to correlate component performance information associated with at least two

components in the process in order to derive correlated process performance information, and to select the desired operating point as the optimum performance point within the allowable range of operation according to the correlated process performance information(see Irvin col 10 lines 31-34).

Regarding claim 36, Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin further disclose the control system wherein the process comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor(see Irvin col 1 line 49 and col 1 lines 23-25 and fig 1), and wherein the means for selecting a desired operating point comprises: means for correlating at least two of motor efficiency information. pump efficiency information. and motor drive efficiency information in order to derive correlated process efficiency information; and means for selecting the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated process efficiency information(see Irvin col 10 lines 31-34).

5. Claims 7-9, 12, 14-16, 28, 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hays et al. U.S Patent No. 6,260,004 and Webster, "Wiley Encyclopedia of Electrical and Electronics Engineering", Vol. 13, 1999 in view of Irvin U.S. Patent No. 5,742,500 and further in view of Crane U.S. Patent No. 4,584,654.

Regarding claim 12 Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin disclose all the limitations of the base claim.

But Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin fail to clearly specify controlling the system according to the desired operating point comprises providing a setpoint to a controller associated with the system according to the desired operating point.

However Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin and further in combination with Crane discloses controlling the system according to the desired operating point comprises providing a setpoint to a controller associated with the system according to the desired operating point(see Crane col 3 lines 13-15).

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin and further combining it with the invention disclosed by Crane.

One of ordinary skill in the art would have been motivated to do this modification in order to obtain optimum operating characteristics and efficiencies, as suggested by Crane.

Regarding claim 7 and 14 Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin and further in combination with Crane further disclose obtaining at least one of the efficiency information, the allowable range and the system setpoint from a host computer (see Crane col 3 lines 38-43).

Regarding claims 8, 15, and 28 Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin and further in combination with Crane

further disclose at least one of the efficiency information the allowable range, and the system setpoint is obtained via a network (see Crane col 4 lines 65-67).

Regarding claims 9, 16 and 29 Hays et al. and "Wiley Encyclopedia of Electrical and Electronics Engineering" in combination with Irvin and further in combination with Crane further disclose at least one of the efficiency information, the allowable range, and the system setpoint is obtained via wireless communications (see Crane col 4 lines 61-65).

Citation of Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the state of the art with respect to system and method for dynamic multi-objective optimization of pumping system operation and diagnostics:

a. U.S. Pat. No. 3,947,738 to Oliver which discloses pulsed power supply.

b. U.S. Pat. No. 4,019,107 to Dixon et al., which discloses D.C. motor control system.

c. U.S. Pat. No. 4,733,146 to Hamby, which discloses energy recovery system for cyclic drives.

d. U.S. Pat. No. 5,780,990 to Weber, which discloses a parasynchronous induction motor control method and apparatus.

e. U.S. Pat. No. 5,796,236 to Royak, which discloses slip adjuster for use in electrical motor controllers.

f. U.S. Pat. No. 5,939,807 to Patyk, which discloses Cap mounted drive for a brushless DC motor.

g. U.S. Pat. No. 5,943,223 to Pond, which discloses an electric switches for reducing on-state power loss.

h. U.S. Pat. No. 5,952,798 to Jones et al., which discloses brushless DC motor assembly control circuit.

i. U.S. Pat. No. 6,379,119 to Truninger, which discloses hybrid electric and hydraulic actuation system.

The following publications are cited to further show the state of the art with respect to system and method for dynamic multi-objective optimization of pumping system operation and diagnostics:

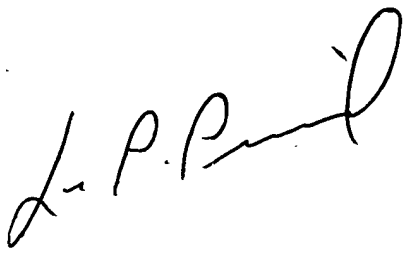
j. Motorola, Inc , "High-Current DC Motor Drive Uses Low On-Resistance Surface Mount MOSFETs", 1992.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos Ortiz-Rodriguez whose telephone number is (571) 272-3747. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo P. Picard can be reached on (571) 272-3749. The central official fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the general information number at 800-786-9199.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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August 5, 2005